

We claim:

1. A DNA sequence containing the encoding region of a plant PRPP amidotransferase, wherein this DNA sequence has the nucleotide sequence SEQ-ID No. 1 or SEQ-ID No. 3.
2. A DNA sequence hybridizing with the DNA sequence SEQ-ID No. 1 or SEQ-ID No. 3 as claimed in claim 1 or parts thereof or derivatives, derived from this sequence by insertion, deletion or substitution and encoding a protein which has the biological activity of a PRPP amidotransferase.
3. A protein with PRPP amidotransferase activity comprising an amino acid sequence which constitutes a subsequence of at least 100 amino acids from SEQ-ID No. 2 or SEQ-ID No. 4.
4. A protein as claimed in claim 3, which comprises, as amino acid sequence, the subsequence 100 - 450 from SEQ-ID No. 2 or SEQ-ID No. 4.
5. A protein as claimed in claim 4, which comprises, as amino acid sequence, the sequence shown in SEQ-ID No. 2 or SEQ-ID No. 4.
- 25 6. The use of a DNA sequence as claimed in claim 1 or 2 for introduction into pro- or eukaryotic cells, this sequence optionally being linked to control elements which ensure transcription and translation in the cells and leading to the expression of a translatable mRNA which causes the synthesis of a plant PRPP amidotransferase.
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- 30 7. The use of a DNA sequence as claimed in claim 1 or 2 for generating an assay system for identifying herbicidally active plant PRPP amidotransferase inhibitors.
- 35 8. A method of finding herbicidally active substances which inhibit the activity of the plant PRPP amidotransferase, which comprises preparing, in a first step, PRPP amidotransferase using a DNA sequence as claimed in claim 1 or 2 and measuring, in a second step, the activity of the plant PRPP amidotransferase in the presence of a test substance.
- 40 45 9. The method as claimed in claim 9, wherein the plant PRPP amidotransferase is measured in a high-throughput screening (HTS). The method as claimed in claim 9, wherein the plant

PRPP amidotransferase is measured in a high-throughput screening (HTS).

10. A method of identifying herbicidally active substances which
5 inhibit the PRPP amidotransferase activity in plants, with
the following steps:
- 10 a) the generation of transgenic plants, plant tissues or
plant cells which comprise an additional DNA sequence
encoding an enzyme with PRPP amidotransferase activity
and which are capable of overexpressing an enzymatically
active PRPP amidotransferase;
- 15 b) applying a substance to transgenic plants, plant cells,
plant tissue or plant parts and to untransformed plants,
plant cells, plant tissue or plant parts;
- 20 c) determining the growth or the viability of the transgenic
and the untransformed plants, plant cells, plant tissue
or plant parts after application of the chemical
substance; and
- 25 d) comparing the growth or the viability of the transgenic
and the untransformed plants, plant cells, plant tissue
or plant parts after applying the chemical substance;
- 30 where a suppression of the growth or the viability of the
untransformed plants, plant cells, plant tissue or plant
parts, but an absence of potent suppression of the growth or
viability of the transgenic plants, plant cells, plant tissue
or plant parts, confirms that the substance of b) shows
herbicidal activity and inhibits the PRPP amidotransferase
enzyme activity in plants.
- 35 11. An assay system based on the expression of a DNA sequence
SEQ-ID No. 1 or SEQ-ID No. 9 as claimed in claim 1 or 2 for
identifying herbicidally active plant PRPP amidotransferase
inhibitors.
- 40 12. An assay system as claimed in claim 11 for identifying
herbicidally active plant PRPP amidotransferase inhibitors,
which comprises incubating the enzyme with a test substrate
to be studied and, after a suitable reaction time,
determining the enzymatic activity of the enzyme in
45 comparison with the activity of the uninhibited enzyme.

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13. A plant PRPP amidotransferase inhibitor.

JUL 1977 14. A plant PRPP amidotransferase inhibitor identified using an assay system as claimed in claim 11 or 12.

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15. An inhibitor as claimed in claim 13 or 14 for use as herbicide.

10 16. A method of eliminating undesired vegetation, which comprises treating the plants to be eliminated with a compound which binds specifically to PRPP amidotransferase encoded by a DNA sequence as claimed in claim 1 or 2 and which inhibits its function.

15 17. A plant with a modified purine nucleotide content, generated by additionally expressing a DNA sequence SEQ-ID No. 1 or SEQ-ID No. 3 as claimed in claim 1 or 2 in sense or antisense orientation.

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